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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/821,788

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Martin Edelmann

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EXAMINER

HARRINGTON, ALICIA M

ART UNIT

PAPER NUMBER

2873

DATE MAILED: 09/27/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/821,788	EDELMANN, MARTIN	
	Examiner	Art Unit	
	Alicia M. Harrington	2873	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 17 July 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-12, 14 and 16-28 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-12, 14 and 16-28 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 19 April 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 112

1. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

2. Claims 1-12,14 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. Claim 1 recites, " the first optical axis is substantially laterally displaced from and substantially parallel to the second optical axis". However, the specification fails to support this feature. Thus, one of ordinary skill in the art would not know how to make and/or uses this invention without undue experimentation.
Claims 2-12 and 14 depend from claim 1.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been

obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 1,4-12,16,19-27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Roberts (US 5,396,349) in view of Tanijiri et al (US 2001/0038361).

Regarding claim 1, Roberts discloses an image-generating unit for generating a polychromatic image (see col. 2, lines 60-67) and deflection optics comprising first (5,7 or 1 or 8 or 13,15) and second (1 or 8 or 5,7 or 13,15) partial optics, said deflection optics (see col. 3, lines 3-60) projecting the image such that it is perceivable by a user wearing said HMD device, wherein the two partial optics each contain a diffractive optical unit for beam deflection, which are desired such that their dispersion errors compensate each other (see col. 4, lines 10-18 and 50-65); and wherein the second partial optics are arranged in front of the eye of the user wearing the HMD device so as allow the user to perceive his environment through said optics (see col. 6, lines 1-10). Robert teaches the head mounted system can be used in a variety of head mounted systems (see col. 5, lines 56-67). And the second partial optics (for example 1 or 8) have a curved material interface facing the user eye, and wherein the diffractive optical unit of the second partial optics is located on the curved material interface (Roberts discloses (elements 1 or 8) as an HOE optic wherein the optics is a curved material facing the users eye. Since elements 1 or 8 are HOE elements, the light rays are modified by diffraction and thus qualify as a diffractive optical element wherein the first and second partial optics are laterally displaced from the other,

and the first partial optics deflects light to diffractive unit of the second partial optics. However, Roberts fails to specifically disclose an embodiment of the display system where the second optics has a refractive effect for correction of visual deficiencies of the user.

In the same field of endeavor, Tanijiri discloses a head mounted display with partial optics containing diffractive optics for projecting/reflecting an image to the user and has a refractive effect (power) to correct for the visual deficiencies of the user (see sections 50 and 59 for example). Thus, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Robert to include partial optics having refractive effect to correct visual deficiencies of user, for the purpose of allowing the observer to see the image and environment clearly.

Additionally, Roberts first and second optics optical axes aren't "substantially parallel", Roberts can still incorporated the both optics into a HMD (compact) and the optics still provide a clear image, meets the claimed function and thus works equally as well. Thus applicant's limitation lacks criticality in the invention.

Regarding claim 4, Roberts discloses the HMD device as claimed in Claim 1, wherein the diffractive optical unit of at least one of the first and second partial optics (for example 5,7 or 1- closes loop line -circle) is provided as a line grating (see col. 3, lines 50-60).

Regarding claim 5, Roberts discloses the HMD device as claimed in Claim 4, wherein the line grating serves the purpose of beam deflection (see figure 2 for example).

Regarding claim 6, Roberts discloses the HMD device as claimed in Claim 4, wherein the line grating serves the purpose of beam deflection and also as an imaging optical element (see for example figure 2 and col. 3).

Regarding claim 7, Roberts discloses the HMD device as claimed in claim 6, wherein Robert discloses the line spacing need not necessarily be constant (see col. 3, lines 50-65). However, Robert and Tanijiri fail to specifically disclose the grating constant of the line grating varies with respect to the imaging effect.

Although, it would have been obvious to one of ordinary skill in the art at the time the invention was made to provide a variable grating constant, since it is known that variable gratings produce different light diffractive effects based on the wavelength of light impinging and the system is a polychromatic light system; thus, the system can produce focused light for the images resulting from multiple wavelengths of light when the constant is variable (i.e. improves transmission and deflection of light in accordance with its wavelength which provide a improved color image to the user).

Regarding claim 8, Roberts discloses the device as claimed in Claim 4, wherein the line grating is formed on or in a curved material interface (for example 1; see col. 3, lines 50-60; col. 4, lines 20-30).

Regarding claim 9, Robert discloses the HMD device as claimed in Claim 8, wherein the material interface is spherically curved (see figure 1 for example).

Regarding claim 10, Robert discloses the HMD device as claimed in Claim 9, wherein said deflection optics comprise a refractive/diffractive element having a

first and a second side, said first side being said spherically curved material interface (see visor 1 in figure 1 for example).

Regarding claim 11, Robert discloses the HMD device as claimed in Claim 10, wherein said line grating formed on or in said spherically curved material interface is adapted to provide a desired aspherical effect. The curved surface is designed to bend/refract/deflect light to the user eye and thus provides an image display at infinity superimposed on an outside scene using the gratings.

Regarding claim 12, Robert discloses the HMD device as claimed in Claim 4, wherein the line grating is formed on or in a planar material interface (for example see col. 3, lines 50-55).

Regarding claim 16, Roberts discloses an image-generating unit for generating a polychromatic image (see col. 2, lines 60-67) and deflection optics comprising first (5,7 or 1 or 8 or 13,15) and second (1 or 8 or 5,7 or 13,15) partial optics, said deflection optics (see col. 3, lines 3-60) projecting the image such that it is perceivable by a user wearing said HMD device, wherein the two partial optics each contain a diffractive optical unit for beam deflection, which are desired such that their dispersion errors compensate each other (see col. 4, lines 10-18 and 50-65); and wherein the second partial optics are arranged in front of the eye of the user wearing the HMD device so as allow the user to perceive his environment through said optics (see col. 6, lines 1-10). Robert teaches the head mounted system can be used in a variety of head mounted systems (see col. 5, lines 56-67). And the second partial optics (for example 1 or 8) have a curved material interface facing the user eye, and wherein the diffractive optical unit of

the second partial optics is located on the curved material interface (Roberts discloses (elements 1 or 8) as an HOE optic wherein the optics is a curved material facing the users eye. Since elements 1 or 8 are HOE elements, the light rays are modified by diffraction and thus qualify as a diffractive optical element. . However, Roberts fails to specifically disclose an embodiment of the display system where the second optics has a refractive effect for correction of visual deficiencies of the user.

In the same field of endeavor, Tanijiri discloses a head mounted display with partial optics containing diffractive optics for projecting/reflecting an image to the user and has a refractive effect (power) to correct for the visual deficiencies of the user (see sections 50 and 59 for example). Thus, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Robert to include partial optics having refractive effect to correct visual deficiencies of user, for the purpose of allowing the observer to see the image and environment clearly.

In addition, Roberts curved interface projects diffractive light to the eye of the user. Although, Roberts fails to specifically state the interface is a diffractive reflective unit, it would have been obvious to one of ordinary skill in the art at the time the invention was made to include this feature, to ensure all the image light is projected to the eye and Roberts illustrates the light rays are all directed toward the user's eyes.

Claims 19—27 are substantially equivalent to claims 4-12 and are treated as discussed above in claims 4-12.

5. Claims 1-3,14,16-18,28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Popovich (US 2001/0024177) in view of Tanijiri et al (US 2001/0038361).

Regarding claim 1, Popovich discloses an image-generating unit for generating a polychromatic image (see sections 15-17,20 and 22) and deflection optics comprising first (14 or 16) and second (14 or 16) partial optics, said deflection optics (see sections 27-28) projecting the image such that it is perceivable by a user wearing said HMD device, wherein the two partial optics each contain a diffractive optical unit for beam deflection, which are desired such that their dispersion errors compensate each other (see sections 33 and figure 1); wherein the second partial optics (for example 14) arranged in front of the eye of a user wearing the HMD device are provided so as to allow the user to perceive his environment through said optics (see sections 22,35,36).

And the second partial optics has a material interface facing the user's eye and where the diffractive optical unit is located on the material interface wherein the first and second partial optics are laterally displaced from each other and the first partial optics deflects light to diffractive unit of the second partial optics. However, Popovich fails to specifically disclose an embodiment of the display system where the second optics has a refractive effect for correction of visual deficiencies of the user.

In the same field of endeavor, Tanijiri discloses a head mounted display with partial optics containing diffractive optics for projecting/reflecting an image to the user and has a refractive effect (power) to correct for the visual deficiencies

of the user (see sections 48-50 and 59 for example). Thus, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Popovich to include partial optics having refractive effect to correct visual deficiencies of user, for the purpose of allowing the observer to see the image and environment clearly. However, Popovich and Tanijiri fail to specifically disclose an embodiment where the second partial optics has a curved material interface. It has been held that a mere change in shape without affecting the functioning of the part would have been within ordinary skill in the art, *In re Dailey et al.*, 149 USPQ 47; *Eskimo Pie Corp v. Levous et al.*, 3 USPQ 23.

Additionally, Popovich first and second optics optical axes aren't "substantially parallel", Roberts can still incorporated the both optics into a HMD (compact) and the optics still provide a clear image, meets the claimed function and thus works equally as well. Thus applicant's limitation lacks criticality in the invention.

Regarding claim 2, Popovich discloses the HMD device as claimed in Claim 1, wherein use is made of a non-zeroth order of diffraction of the diffractive optical units for beam deflection (see sections 22 and 27).

Regarding claim 3, Popovich discloses the HMD device as claimed in Claim 2, wherein the same order of diffraction is used for both diffractive optical units (see sections 22 and 27).

Regarding claim 14, Popovich discloses the HMD device as claimed in Claim 13, wherein the user can see through the diffractive optical unit of the second partial optics in the zeroth order of diffraction (see sections 22,35,36).

Claims 16-18 and 28 are substantially equivalent to claims 1-3,14, and are rejected as discussed above in claims 1-3,14.

5. Claims 2,3,14,17,18,28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Roberts (US 5,396,349) in view of Tanijiri et al (US 2001/0038361), further view of Popovich (2001/0024277).

Roberts fails to specifically disclose the diffractive units use non-zero order (claims 2 and 17); the same order for both units (claims 3 and 18); and the second partial optics uses zero order diffraction (claims 14 and 28). However Popovich teaches a HMD with two diffractive elements wherein the use is made of a non-zeroth order of diffraction of the diffractive optical units for beam deflection (see sections 22 and 27); wherein the same order of diffraction is used for both diffractive optical units (see sections 22 and 27); and wherein the user can see through the diffractive optical unit of the second partial optics in the zeroth order of diffraction (see sections 22,35,36). Thus, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify, Robert in view of Tanijiri, to include these features since it would help to prevent color aberrations, as taught by Popovich, in a HMD with two diffractive units.


Conclusion

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Alicia M. Harrington whose telephone number

is 571 272 2330. The examiner can normally be reached on Monday - Friday 9:00-5:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ricky Mack can be reached on 571 272 2333. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.



Alicia M Harrington
Primary Examiner
Art Unit 2873

AMH